ASSIGNMENT BOOKLET

Bachelor's Degree Programme
(BSCG)

SOLUTIONS, PHASE EQUILIBRIUM, CONDUCTANCE, ELECTROCHEMISTRY & FUNCTIONAL GROUP ORGANIC CHEMISTRY-II

Valid from 1st January, 2024 to 31st December, 2024

Please Note

- **You can take electives (56 to 64 credits) from a minimum of TWO and a maximum of FOUR science disciplines, viz. Physics, Chemistry, Life Sciences and Mathematics.**

- **You can opt for elective courses worth a MINIMUM OF 8 CREDITS and a MAXIMUM OF 48 CREDITS from any of these four disciplines.**

- **At least 25% of the total credits that you register for in the elective courses from Life Sciences, Chemistry and Physics disciplines must be from the laboratory courses. For example, if you opt for a total of 64 credits of electives in these 3 disciplines, at least 16 credits should be from lab courses.**

- **You cannot appear in the Term-End Examination of any course without registering for the course. Otherwise, your result will not be declared and the onus will be on you.**

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THE PEOPLE'S UNIVERSITY

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2024)

Dear Student,

Please read the section on assignments in the Programme Guide for B. Sc. that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment is in this booklet, and it consists of two parts, Part A and B. It covers all blocks of the course. The total marks of all the parts are 100, of which 35% are needed to pass it.

Instructions for Formatting Your Assignments

Before attempting the assignment please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ROLL NO.: …………………………………………

NAME: …………………………………………

ADDRESS: …………………………………………

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COURSE CODE: …………………………….

COURSE TITLE: …………………………….

ASSIGNMENT NO.: …………………………….…

STUDY CENTRE: …………………………....….. **DATE:** …………………………………………...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) Solve Part (A) and Part (B) of this assignment, and **submit the complete assignment answer sheets within the due date.**

6) The assignment answer sheets are to be submitted to your Study Centre within the due date. **Answer sheets received after the due date shall not be accepted.**

   We strongly suggest that you retain a copy of your answer sheets.

7) This assignment is **valid from 1ˢᵗ January, 2024 to 31ˢᵗ December, 2024**. If you have failed in this assignment or fail to submit it by December, 2024, then you need to get the assignment for the year 2025, and submit it as per the instructions given in the Programme Guide.

8) **You cannot fill the examination form for this course** until you have submitted this assignment.

   We wish you good luck.

Tutor Marked Assignments

BCHCT-135: Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry-II
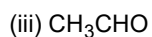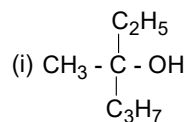## Core Course in Chemistry

Note: Attempt all questions. The marks for each question are indicated against it.

PART-(A)   (50)

1. Discuss the fractional distillation for a mixture of benzene and toluene using a suitable diagram.   (5)

2. (a) Give the thermodynamic derivation of distribution law.   (2)

   (b) Write any two applications of solvent extraction.   (3)

3. (a) Derive the expression for distribution coefficient when the solute dissociates is one of the solvents.   (2)

   (b) Differentiate between true, metastable and unstable equilibria giving suitable examples.   (3)

4. (a) State Gibbs phase rule and give its mathematical form.   (2)

   (b) How many components are there in the following systems? Briefly discuss.   (3)

   (i) $CaCO_3 \rightleftharpoons CaO + CO_2$

   (ii) $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$

5. (a) Calculate the maximum number of phases and maximum number of degrees of freedom that   (3)

   (b) Can exist for a one-component system.   (2)

   When is a system called invariant? Illustrate with an example.

6. Draw and explain the phase diagram of sulphur.   (5)

7. (a) Define conductivity. Give its SI units.   (2)

   (b) List various factors on which the conductivity of electrolytic solutions depends.   (3)

8. Draw and explain the conductometric titration curves for the titration of the following: (5)

   (i) HCl vs NaOH

   (ii) CH_3COOH vs NaOH

9. (a) List the functions of a salt bridge.   (2)

   (b) What are the conditions which a reversible cell should satisfy.   (3)

10. (a) What is an electrolyte concentration cell? Write the expression for E_{cell} for such a cell.   (2)

    (b) Write the reactions occurring at electrodes in the electrolysis of water. Why are a few drops of conc. H_2SO_4 added in this process?   (3)

PART-(B)   (50)

11. Discuss the two methods of decarboxylation of carboxylic acids and comment on the nature of products formed.   (5)

12. How can you propane the following compound starting from ethanoyl chloride?   (5)

$$\text{(i) } CH_3 - \overset{\overset{\displaystyle C_2H_5}{|}}{\underset{\underset{\displaystyle C_3H_7}{|}}{C}} - OH$$

(ii) $CH_3COOCH_2CH_3$

(iii) CH_3CHO

13. Briefly explain Hofmann elimination. Also give the importance of this reaction. (5)

14. Differentiate between Sandmeyer reaction and Gattermann reaction giving suitable examples. (5)

15. Discuss the Hinsberg test for distinguishing primary, secondary and tertiary amines. (5)

16. (a) Discuss the preparation of 2-aminobutanoic acid using Strecker synthesis. (3)
    (b) What is cope elimination? Give reaction. (2)

17. (a) Briefly explain this general structure and classification of peptides. (4)
    (b) What is bradykinin? Give its role? (1)

18. How is *C*-terminal indentified in a peptide or a protein? Discuss. (5)

19. (a) Explain the cyctic hemiacetal formation by glucose. (3)
    (b) Explain mutarotation in glucose. (2)

20. Discuss the important features of structure of cellulose giving suitable diagram. (5)